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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,628	08/31/2001	Gary Q. Jin	11775-US	9081

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EXAMINER	
QURESHI, AFSAR M	

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 05/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/942,628	JIN, GARY Q.	
	Examiner	Art Unit	
	Afsar M. Qureshi	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,3 and 10-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,3,10-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to amendments and Remarks received on 2/21/2006.

Response to Arguments

2. Applicant's arguments filed on 2/21/2006 have been fully considered but they are not persuasive.

Applicant argued that Wallace et al. (US 6,473,467) disclose same IFFT being used for the different sub-bands. The Examiner believes that different IFFTs are used for each sub-band (see col. 14, lines 40-55, col. 20, lines 59 through col. 21, lines 1-7, also see Fig. 3).

Regarding claim 17, the Examiner has corrected the cited reference from Fig. 6 to Fig. 3 in the rejection of claim 17. The references to IFFTs, in col. 20, lines 62-64 and col. 21, lines 5-7, do not specifically disclose that it is the same IFFT. The schematic representation, Examiner contends, can be interpreted as plurality of IFFTs represented by one numeric 320.

The Examiner contends that all the limitations are being anticipated by Wallace (US 6,473,467) as stated in the Office action (11/22/2005) as follows:

3. **The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.**

4. Claims 11, 15, 17, 20, 25, 30, 31, 36 are rejected under 35 U.S.C.

102(e) as being anticipated by Wallace et al. (US 6,473,467).

Wallace et al. disclose a communication system comprising the following features: Regarding claim 11 wherein said FFT (FIG. 6, FFT 614A, 614R) is implemented for only a single side band of said sub-bands (column 11, lines 41-57; column 19, lines 47-57); regarding . claim 15, when the method is used in a frequency division multiplexing application, the bandwidth varies from one sub-band to another (column 19, line 58 to column 20, line 9), with a corresponding variation of size of said plurality of different FFTs (FIG. 6, FFT 614A, 614R); regarding claim 17, a broad bandwidth, high data rate communications system employing Fast Fourier Transform comprising a transmitter (FIG. 3, TRANSMITTER 100) and a receiver (FIG. 6, RECEIVER), the transmitter (FIG. 3, TRANSMITTER 100) having means for dividing the bandwidth into sub-bands (column 11, lines 41-57; column 19, lines 47-57) each for a corresponding sub-band signal; and means for performing Inverse Fast Fourier Transform IFFT (FIG. 3, IFFT 320A, 320B, 320T) upon the sub-band signals using, for each sub-band signal, a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R) and transmitting the transformed signals to the receiver (FIG. 6, RECEIVER); the receiver (FIG. 6, RECEIVER) having means for receiving the transformed sub-band signals and performing forward Fast Fourier Transform thereupon using, for each transformed sub-band signal, a respective ogle of a plurality of different IFFTs (FIG. 3); regarding claim 20, a transmitter (FIG. 3, TRANSMITTER 100) for use in a broad bandwidth, high data rate communications system employing Fast Fourier Transform, the transmitter (FIG.

3, TRANSMITTER 100) having means for dividing the bandwidth into sub-bands (column 11, lines 41-57; column 19, lines 47-57) each for a corresponding sub-band signal; and means for performing Inverse Fast Fourier Transform IFFT (FIG. 3, IFFT 320A, 320B, 320T) upon the sub-band signals using, for each sub-band signal, a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R); regarding claim 25, A receiver (FIG. 6, RECEIVER) for use in a broad bandwidth, high data rate communications system employing Fast Fourier Transform FFT (FIG. 6, FFT 614A, 614R), in which transmitted signals are divided into sub bands and converted using, for each sub band signal, a respective one of a plurality of Inverse Fast Fourier Transforms IFFTs (FIG. 3, IFFT 320A, 320B, 320T), the receiver (FIG. 6, RECEIVER) having: means for receiving a plurality of subband signals in said corresponding plurality of sub bands; and means for performing Fast Fourier Transform upon the received sub band signals using, for each sub band signal, a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R) corresponding to the IFFTs (FIG. 3, IFFT 320A, 320B, 320T); regarding claim 30, a method of implementing a Fast Fourier Transform FFT (FIG. 6, FFT 614A, 614R) in a broad bandwidth, high data rate communications system comprising a transmitter (FIG. 3, TRANSMITTER 100) and a receiver (FIG. 6, RECEIVER), the method comprising the steps of at the transmitter (FIG. 3, TRANSMITTER 100), dividing the bandwidth into sub bands each for a corresponding sub band signal; and performing Inverse Fast Fourier Transform IFFT (FIG. 3, IFFT 320A, 320B, 320T) upon the sub band signals using, for each subband signal, a respective one of a

plurality of different FFTs (FIG. 6, FFT 614A, 614R) and transmitting the transformed subband signals to the receiver (FIG. 6, RECEIVER); and at the receiver (FIG. 6, RECEIVER), performing forward Fast Fourier Transform upon the received transformed sub band signals using, for each sub band signal, a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R) corresponding to those in the transmitter (FIG. 3, TRANSMITTER 100); regarding claim 31, A method of processing signals for transmission by a transmitter (FIG. 3, TRANSMITTER 100) in a broad bandwidth, high data rate communications system employing Fast Fourier Transform, the method comprising the steps of dividing the bandwidth into sub bands each for a corresponding sub band signal; and performing Inverse Fast Fourier Transform IFFT (FIG. 3, IFFT 320A, 320B, 320T) upon the sub band signals using, for each sub band signal, a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R); regarding claim 36, A method of processing received signals in a receiver (FIG. 6, RECEIVER) in a broad bandwidth, high data rate communications system employing Fast Fourier Transform FFT (FIG. 6, FFT 614A, 614R), in which transmitted signals are divided into sub bands and converted using, for each sub band signal, a respective one of a plurality of Inverse Fast Fourier Transforms IFFTs (FIG. 3, IFFT 320A, 320B, 320T), the receiving method comprising the steps of receiving a plurality of said sub band signals in a corresponding plurality of sub bands; and performing Fast Fourier Transform upon the received sub band signals using, for each sub band signal,

a respective one of a plurality of different FFTs (FIG. 6, FFT 614A, 614R) corresponding to the IFFTs (FIG. 3, IFFT 320A, 320B, 320T). See column 1-29.

5. Claims 2, 3, 10, 12, 13, 14, 16, 21, 22, 26, 27, 32, 33, 37, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,473,467) in view of Murakami (US 6,317,409).

Wallace et al. disclose the claimed limitations above. Wallace et al. further discloses the following features: regarding claim 13, the step of using a modulator (Fig. 3, modulator 114A, 114B, 114T) to process each sub-band separately prior to implementation of the FFT (FIG 6, FFT 614A, 614R). Wallace et al. does not disclose the following features: regarding claim 2, wherein the transmitter and receiver each further include pass band filters to isolate desired sub-band frequencies; regarding claim 3, wherein the transmitter has a modulator to process each sub-band separately prior to implementation of the and up-sampling means in advance of the filter to up-sample each sub-band signal to the desired sampling rate, the receiver having corresponding down-sampling means and a corresponding demodulator; regarding claim 10, at each of the transmitter and the receiver, the step of providing using pass band filters to isolate desired sub-band frequencies; regarding claim 12, wherein a single side band filter is used; regarding claim 14, wherein before said filtering, each sub-band signal is un-sampled to the desired sampling rate; regarding claim 16, wherein up and down sampling rates also vary correspondingly; regarding claim 21, including pass band filters to isolate desired sub band frequencies; regarding

claim 22, having a modulator to process each sub band separately prior to implementation of the IFFT and up sampling means in advance of the pass band filters to up sample each sub band signal to the desired sampling rate; regarding claim 26, wherein the receiver further includes pass band filters to isolate desired sub band frequencies; regarding claim 27, for use with received sub band signals that have been modulated separately prior to implementation of the IFFT and up sampled, the receiver having corresponding down sampling means and a corresponding demodulator; regarding claim 32, wherein pass band filters are used to isolate desired sub band frequencies; regarding claim 33, wherein a modulator is used to process each sub band separately prior to implementation of the IFFT and each sub band signal is up sampled to the desired sampling rate prior to passband filtering; regarding claim 37, wherein the receiver a received signal is filtered using pass band filters to isolate desired sub band frequencies; regarding claim 38, for processing received sub band signals that have been modulated separately prior to implementation of the IFFT and up sampled, the method comprising the steps of down sampling and demodulating the received sub band signals using a complementary demodulator and down sampling rate.

Murakami discloses a communication system comprising the following features: Regarding claim 2, wherein the transmitter and receiver each further include pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to isolate desired sub-band frequencies; regarding claim 3, wherein the transmitter has a modulator (FIG 1, Modulator 3) to process each sub-band

separately prior to implementation of the and up-sampling (FIG. 2, up-sampler 130) means in advance of the filter (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to up-sample (FIG. 2, up-sampler 130) each sub-band signal to the desired sampling rate, the receiver having corresponding down-sampling (FIG. 10, down sampler L'M) means and a corresponding demodulator (FIG 1, demodulator 5); regarding claim 10, at each of the transmitter and the receiver, the step of providing using pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to isolate desired sub-band frequencies; regarding claim 12, wherein a single side band filter (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) is used; regarding claim 14, wherein before said filtering (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43), each sub-band signal is un-sampled to the desired sampling rate; regarding claim 16, wherein up (FIG. 2, up sampler 130 tK) and down-sampling (FIG. 10, down sampler 4'M) rates also vary correspondingly; regarding claim 21, including pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to isolate desired sub band frequencies; regarding claim 22, having a modulator (FIG 1, Modulator 3) to process each sub band separately prior to implementation of the IFFT (FIG. 2, M-point IFFT 120) and up sampling means in advance of the pass band filters (FIG. 1, Q0(z), Q 1(z); column 4, lines 20-22; column 5, lines 28-43) to up-sample (FIG. 2, up-sampler 130) each sub band signal to the desired sampling rate; regarding claim 26, wherein the receiver further includes pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to isolate desired sub band

frequencies; regarding claim 27, for use with received sub band signals that have been modulated separately prior to implementation of the IFFT (FIG. 2, M-point IFFT 120) and up-sample (FIG. 2, up-sampler 130) d, the receiver having corresponding down-sampling (FIG. 10, down sampler ~M) means and a corresponding demodulator (FIG 1, demodulator 5); regarding claim 32, wherein pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) are used to isolate desired sub band frequencies; regarding claim 33, wherein a modulator (FIG 1, Modulator 3) is used to process each sub band separately prior to implementation of the IFFT (FIG. 2, M-point IFFT 120) and each sub band signal is up-sample (FIG. 2, up-sampler 130) d to the desired **sampling rate prior to passband filtering** (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43); regarding claim 37, wherein the receiver a received signal is filter (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43)ed using pass band filters (FIG. 1, Q0(z), Q1(z); column 4, lines 20-22; column 5, lines 28-43) to isolate desired sub band frequencies; regarding claim 38, for processing received sub band signals that have been modulated separately prior to implementation of the IFFT (FIG. 2, M-point IFFT 120) and up-sample (FIG. 2, up-sampler 130) d, the method comprising the steps of down-sampling (FIG. 10, down sampler 4•M) and demodulating (FIG 1, Modulator 3) (FIG 1, demodulator 5) the received sub band signals using a complementary demodulator (FIG 1, demodulator 5) and down-sampling (FIG. 10, down sampler 4•M) rate. See column 1-14. It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the

system Wallace et al., by using the features, as taught by Murakami, in order to provide an efficient data communication without inducing inter-channel interference. See Murakami, column 2, lines 28-34.

6. Claims 18, 19, 23, 24, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,473,467) in view of Murakami (US 6,317,409) as applied to claims 17, 2, 3, 20-22, 25-27 above, and further in view of Kim et al. (US 6,690,717).

Wallace et al. and Murakami disclose the claimed limitations above. Wallace et al. and Murakami do not disclose the following features: regarding claim 18, wherein the transmitter and receiver are configured for transmitting and receiving, respectively, Discrete Multi tone DMT signals via a Digital Subscriber Line DSL; regarding claim 19, wherein the transmitter and receiver arc configured for use with a Very high rate Digital Subscriber Line VDSL; regarding claim 23, configured for transmitting Discrete Multi tone DMT signals via a Digital Subscriber Line DSL; regarding claim 24, configured for use with a Very high rate Digital Subscriber Line VDSL; regarding claim 28, configured for receiving said sub-band signals in the form of Discrete Multi-tone DMT signals via a Digital Subscriber Line DSL. Kim et al. discloses a communication system comprising the following features: regarding claim 18, wherein the transmitter and receiver are configured for transmitting and receiving, respectively, Discrete Multi tone DMT signals via a Digital Subscriber Line DSL (column 2, lines 56-67); regarding claim 19, wherein the transmitter and receiver arc

configured for use with a Very high rate Digital Subscriber Line VDSL (column 2, lines 56-67); regarding claim 23, configured for transmitting Discrete Multi tone DMT signals via a Digital Subscriber Line DSL (column 2, lines 56-67); regarding claim 24, configured for use with a Very high rate Digital Subscriber Line VDSL (column 2, lines 56-67); regarding claim 28, configured for receiving said sub-band signals in the form of Discrete Multi-tone DMT signals via a Digital Subscriber Line DSL (column 2, lines 56-67). It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system Wallace et al. and Murakami, by using the features, as taught by Kim et al., in order to provide a broader bandwidth and transmit with better quality of data. See Kim et al., column 2, lines 46-51.

7. Claims 29, 34, 35, 39, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,473,467) in view of Kim et al. (US 6,690,717).

Wallace et al. discloses the claimed limitations above. Wallace et al. does not disclose the following features: regarding claim 29, configured for use with a Very high rate Digital Subscriber Line VDSL; regarding claim 34, the step of transmitting the transformed sub bands signals as Discrete Multi tone DMT signals via a Digital Subscriber Line DSL; regarding claim 35, wherein the transformed sub band signals are transmitted via a Very high rate Digital Subscriber Line VDSL; regarding claim 39, wherein said sub band signals are received in the form of Discrete Multi tone DMT signals via a Digital Subscriber

Line DSL; regarding claim 40, wherein said sub band signals are received via a Very high rate Digital Subscriber Line VDSL. Kim et al. discloses a communication system comprising the following features: regarding claim 29, configured for use with a Very high rate Digital Subscriber Line VDSL (column 2, lines 56-67); regarding claim 34, the step of transmitting the transformed sub bands signals as Discrete Multi tone DMT signals via a Digital Subscriber Line DSL (column 2, lines *56-67);* regarding claim 35, wherein the transformed sub band signals are transmitted via a Very high rate Digital Subscriber Line VDSL (column 2, lines 56-67); regarding claim 39, wherein said sub band signals are received in the form of Discrete Multi tone DMT signals via a Digital Subscriber Line DSL (column 2, lines 56-67); regarding claim 40, wherein said sub band signals are received via a Very high rate Digital Subscriber Line VDSL (column 2, lines 56-67). It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system Wallace et al., by using the features, as taught by Kim et al., in order to provide a broader bandwidth and transmit with better quality of data. See Kim et al., column 2, lines 46-51.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory

period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Afsar M. Qureshi whose telephone number is (571) 272 3178. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ahmad Matar can be reached on (571) 272 7488. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AFSAR QURESHI
PRIMARY EXAMINER

5/10/2006